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(A MONTHLY PUBLICATION)

"The most important factor in diagnosis in the majority of cases of pulmonary tuberculosis is keeping the disease in mind."

Lawrason Brown, M. D.

Editorial Comment

Hear Ye! MORE than five hundred comments have been received during the past two months by the editors of DISEASES OF THE CHEST, attesting to the splendid papers, the fine editorials and the educational value of our journal; which is now entering its second year in the field of medical literature. A New York City physician writes, "I find the advertisements of sanatoria as carried in the DISEASES OF THE CHEST informative and valuable." I wish we had the space to quote all of the fine comments sent to us by our readers.

We are grateful for these expressions of opinion and as it is beyond the physical limitations of the present staff of DISEASES OF THE CHEST to answer each of the writers separately; we are taking this opportunity to thank each one of you, through the columns of this journal for writing to us and at the same time extend an open invitation for further comments and for the submittal of any papers on subjects pertaining to chest diseases.

We call your attention to the special subscription offer as noted on the back inside cover of this issue. If you have not already subscribed to the DISEASES OF THE CHEST, we urge you to take advantage of this unusual offer, while the papers listed on page 32 are still available. M. K.

Sanatoria Status A STARTLING picture of the unfairness of tuberculous hospitalization was outlined in the American Medical Journal of December 7, 1935, by Doctor Frijof Arestad.

Editorial comment in the DISEASES OF THE CHEST was given in the January issue. The importance of the subject certainly warrants a repetition.

Dr. Arestad in this survey pointed out that tax supported institutions were caring for part or full pay patients, yet, had a waiting list of over 8,000 patients that were indigent. The private sanatoria were caring for almost 5,000 patients free, about 3,000 part pay and had approximately 4,000 vacant beds.

Private sanatoria through the taxes they pay help to maintain county, municipal and state institutions. These private sanatoria are conducted the same as any other private business or enterprise, they are an absolute necessity in the treatment of tuberculosis and should be accorded the same consideration with the relation to infringement of rights as other private businesses.

Why should patients that are able to pay be permitted treatment in county, municipal and state institutions when these institutions are primarily for indigent cases? When pay patients are hospitalized in these institutions, the rates charged are invariably less than the per capita cost,

and indirectly the taxpayer is supporting a person able to pay and who usually is not asking for charity.

Why must such a condition go on? If the pay patients in tax supported institutions were compelled to seek hospitalization in private institutions, it would permit the hospitalization of the indigent patients now on the waiting list and would reduce the tax burden in every community in the United States.

The Federation of American Sanatoria does not object to the building of tax supported institutions when needed, but, they do object to over construction in one community and under construction in another with the result that over constructed areas solicit pay patients to keep their beds full.

The Doctors who are among the taxpayers of the country should make an effort to prevent such unreasonable and unnecessary expenditure of their money. At the same time the Federation of American Sanatoria pledges their support towards the building of tax supported institutions wherever and whenever needed for the care of the indigent tuberculosis patients.

L. M.

Protection of Workmen

THE PROTECTION of workmen against dust and its dangers is but one aspect of the more general problem of protection against all trade dangers. The health of workmen in "dusty trades" should be supervised by a physician, especially appointed for this purpose. As a rule, such protection cannot be left entirely to the individual employers, for these are often more interested in their profits than in the health of their workmen and frequently they do not, or will not, appreciate the necessity of rendering the work as hygienic as possible. On the other hand, workmen are often singularly indifferent to the special dangers of their trades, which they accept as a matter of course. Then, too, the idea of personal liberty which has often protected the unscrupulous master or the careless workmen, should give way to a more general conception of the duty of the community to its individual members. In the case of the

"dusty trades," individuals with bronchitis, emphysema and asthma, as well as tuberculosis, should never be employed. The press, recently, has had a lot to say about silicosis and has attracted a great deal of attention, generally, in the case of "dusty trades." Betterment can be expected only when proper laws for protection of workmen are enacted and enforced. Adequate laws will necessarily contain provisions for medical supervision.

C.M.H.

The Treatment of Tuberculosis in Children

THERE ARE two types of tuberculosis which may be found in children, and the treatment differs widely according to the type found in the individual case. The adult type, in which the parenchyma is involved, is less frequently found than the childhood type in which the involvement is largely confined to the lymph glands about the hiluses, the bronchi, the trachea and the cervical region. With the greater precision in diagnosis and the realization of the prevalence of tuberculosis in children, however, more cases of the adult type are being found in children.

Treatment of the two types differs materially. Where the adult type is found in a child, the treatment which is used in adults should be instituted with perhaps a step further in the matter of rest. In other words, in an adult where the amount of involvement and the symptoms of toxemia would indicate that this patient should spend the afternoons in bed, but could be up and on very light exercise in the forenoons, a child with apparently the same extent of involvement should carry out a complete bed rest, possibly allowing bathroom privileges. The reasons for this are numerous:

1st. The child, being in the stage of growth and development, has not built up the natural resistance which an adult should have.

2nd. For the reason that he is in the stage of development, he needs to conserve and store up more of the food which he takes, and this would not be possible if he uses a portion of his food

to produce the energy required for exercise.

3rd. The child's nervous mechanism is more delicate and sensitive than is that of the average adult, and since the toxins produced in tuberculosis are excitants to the central nervous system, and exercise increases the production of these toxins, then rest and not exercise is indicated.

4th. In the very nature of things, the child's exercise differs from that of the average adult in that his movements are quicker, and his exercise as a whole is more vigorous, and he uses more energy in taking it.

In addition to this, the fact that the child is developing into youth or manhood, makes it advisable that more care should be given to the selection of his food as to its vitamin content and other qualities. Children require more proteins, and more minerals than do adults of proportionate weight. Such preparations as cod liver oil, haliver oil and viosterol are not only better tolerated than in the adult, but they are more necessary to the child. In other words, the treatment of the child with the adult type of tuberculosis must be very aggressive, and every step be carried out with the greatest precision.

In the childhood type where the infection is confined to the glands, it is our custom to be much more liberal in the matter of exercise. In this type, too, however, the amount of exercise must be governed by the symptoms of toxemia and the individual characteristics of the child. If he is of the placid, even-tempered type he may be allowed to attend school with safety, provided that his behavior on the play-ground is supervised in that he is not permitted to indulge in exercise which is very strenuous such as playing basket ball or football. Special care, too, should be given to the diet of such a child, very much as in the one with the adult type.

A child of this type may be treated very much as the other children of the family, with the exceptions noted above. It is not necessary to make an invalid out of him by enforcing bed rest, but he should be required to retire early at night, to eat

regularly, and to have the proper kind of food.

The matter of exercise and rest must be varied according to the extent of involvement in the glands, the type of child with which we are dealing, and the severity of toxic symptoms, but in all cases we can be more liberal with the child having the childhood type than the one with the adult type.

Since Iodine seems to have a special alterative effect upon lymph glands, it is our custom to administer it in some form to children with the glandular type of tuberculosis, in addition to the small amount derived from the cod liver oil the child may be taking.

After all, the child with the childhood or glandular type should have such details of treatment carried out as seems in the judgment of the physician best suited to the individual case, bearing in mind that, since the lung itself is not involved, the necessity for rest is not so great.

R.B.H.SR.

Tuberculosis Program WE ARE PLEASED to announce that the "Session on Tuberculosis" to be held in the Section on Miscellaneous Topics of the American Medical Association meeting will take place on Wednesday afternoon, May 13th at Kansas City, Missouri.

Dr. James Alexander Miller, New York City, chairman and Dr. Charles Hartwell Cocke, Asheville, North Carolina, secretary are in charge of the program.

This "Session on Tuberculosis" is a new addition to the regular program of the American Medical Association annual meetings and is looked forward to with a keen interest. It is the hope of the Federation of American Sanatoria, that a "Section on Chest Diseases" be established as a regular feature of the American Medical Association meetings.

The committee is arranging an instructive and interesting program, so make a note of the date, Wednesday, May 13th; and remember that all roads lead to Kansas City from May 11th to 15th. It is going to be a fine meeting—and we'll be looking for you.

M. K.

The Proper Use of Rest*

WHEN DR. THOREN asked for suggestions as to what should be discussed at this meeting, I told her

I thought the whole program of such a meeting could be very profitably devoted to the consideration of what we mean by rest for a tuberculous patient, or words to that effect. In reply, Dr. Thoren asked me to discuss briefly sanatorium regulations and enforcement of rest, passes, smoking, etc., and penalties, if any. I am going to digress from that subject because I want to talk, even if I have time to touch only a few of the high spots, about what I had in mind when I made the suggestion to Dr. Thoren. And that was this.

Although rest is still universally recognized as the fundamental in the treatment of tuberculosis and this idea is continually reiterated and emphasized in the literature, yet I believe there is not a single one of us here who does not constantly see patients, who have been treated in and out of sanatoria, whose chances to regain their health have been thrown away, obviously because they have not been properly advised or taught to rest. Again, the proper use of rest in the early stages of pulmonary tuberculosis would not only restore a much larger percentage of patients to normal health, but it would greatly reduce the number of patients who today must necessarily be submitted to surgery, in varying extents, in an endeavor to save their lives—lives which, if saved, are permanently handicapped.

It is not only men in general practice, but, in many cases, chest men as well, who are responsible for these tragedies. I am well aware that in many of these cases the physician is not to blame, but often, and all too often, he is to blame. There are a number of tuberculosis sanatoria today, both private and public institutions, where the atmosphere is more

BY

E. W. HAYES, M.D.

Monrovia, California

that of a resort hotel than a place for persons suffering with tuberculosis. And many patients with progres-

sive tuberculosis, outside sanatoria, are going about making frequent visits to their physicians' offices for treatment, the majority of whom are walking directly into their graves. So it is my feeling that the California Sanatorium Association could render an excellent service if it would face the issue and, by recognizing its shortcomings, conduct a strenuous campaign for the use of rest in the treatment of tuberculosis as we know it should be used.

By the term rest in the treatment of pulmonary tuberculosis is meant that the patient should be in bed, with one pillow, twenty four hours out of each day and seven days out of each week, mentally, emotionally and physically relaxed. He should deviate from this regimen only when directed by his physician, who should know and be in close touch with his mental, emotional and physical conditions.

It is true that a few patients will get well almost in spite of what they do or are let do, and a few others, even of the early cases, will not recover regardless of what they do. On the other hand, it is also true that the great majority of patients suffering from tuberculosis are eventually cured by attention to details. At the outset, none of us have any way of knowing which of these patients is which. Consequently, we should begin cautiously with them all and only as we are able to accurately visualize the underlying pathology and are then reasonably sure of our ground should we permit the dissipation of energy by exertions.

As physicians, we have no right, in any sense of the word, to gamble with the lives of our patients by taking a chance through following the path of least resistance. We certainly would not want it to be done with members of our families, and every patient is a member of some

*Read before the California branch of the American Sanatorium Association, Livermore, California, November 12, 1935.

family. Sitting up in bed for meals or going to the bathroom even once a day may be just enough to turn the tide in the wrong direction and this, in patients who outwardly may not appear to be extremely sick.

One of the excuses offered for the lack of proper control of patients from the standpoint of rest is that there are a large number of patients who will not heed the admonition to rest. Anyone who has had extensive experiences and who has really tried knows that the proportion of this class of patients is really very small.

Other excuses offered are that many of the public sanatoria are not able to sufficiently staff their institutions to carry out the desired rest program and that these same public institutions are not allowed to keep their patients a sufficient length of time to give them the prolonged rest period they need. There are no doubt grounds for these last two excuses in a number of instances, but it is a sad reflection on these institutions and the work they are doing, for, in reality, they are not getting anywhere, generally speaking. By rotating their patients without giving them sufficient time to reasonably safeguard their future health, they are, for the most part, simply going around in a circle and, while they may be able to secure some cures, from the standpoint of health and from the standpoint of economics, they are failures as far as the treatment of tuberculosis is concerned.

In regard to passes for patients, I do not issue them. I do not believe in them because I have never found them necessary in my private work or in my connection with public institutions. They certainly do not impress the patient with the fact that he should carry out the rest cure with serious attention to details. We cannot blame the patient who is issued a pass for a day each month or for a longer period every few months for feeling that if the doctor believes it all right for him to carouse for that length of time periodically, there is no reason why he should not do some carousing between times. It has been aptly said that a pa-

tient may, and often does, undo in ten minutes all he has accomplished in six months.

In regard to smoking, I think we all pretty generally agree that it is harmful to well people, and I say this in spite of the fact that I began to smoke over forty years ago and still smoke. I did not smoke on the cure. In moderation it may not be harmful, but how many smokers use moderation? What is moderation for one may be excessive for his neighbor. Generally speaking, smoking interferes with the appetite and the assimilation of food. It is an irritant to the respiratory tract and tends increase the cough. It has been my experience that very few patients, if properly approached, can not and will not give up smoking. Finally, smoking on the part of the patient is not in accordance with the spirit that the patient must make sacrifices and follow a rigid regimen.

In regard to penalties, if there is the right setup in the institution and the right atmosphere, the patient who is inclined to violate the regimen mapped out for him, soon finds that he is very unpopular with the other patients and this, in itself, I think, is the most effective penalty. In the Orange County Hospital we try to keep a room or two in an isolated building where we send the occasional uncooperative patient. There he has a chance to think things over and, in a short period, he is usually willing to return to the ward and be good.

The enforcement of rest or any other phase of the cure should be attained primarily by gaining the patient's confidence and making him feel that you are his friend. At the outset, tell him the truth about his condition, as far as you know it, about what he has to do, where he must do it and how he must do it. It is uncertainties that, for the most part, make the patients worry and make them restless. You can always be optimistic about tuberculosis, for it is the most curable of chronic diseases if properly handled. The number of patients that justify giving a hopeless prognosis when first seen is very small. Let the patient under-

(Continued to page 28)

The Tragedy of the Contra-Lateral Lung

IT HAS been the experience of all Psthisialogists, I am sure, to have seen their brilliant therapeutic

efforts—the successful collapse by pneumothorax of a diseased lung, the closure of a cavity by an intra-pleural pneumolysis, the satisfactory diaphragmatic rise and compression from a phrenic paralysis, a well performed apicolysis, or a nicely executed thoracoplasty—thwarted; their rose-colored prognostication beclouded, if not completely reversed; and the very life of the patient on the verge of a triumphant emergence, jeopardized or doomed; by the advent of disastrous trouble in the opposite lung. Therein lies the tragedy and therein the sum and substance of this article. The unfortunate and disappointing experiences, just summarized, have so often been the author's that he finds it necessary, in discussing with the patient or his family some contemplated procedure, to include the inevitable "if." The directional finger of this "if" points steadily towards the opposite or contralateral lung. It would be well and wise for the physician to always make this proviso and thus obviate what otherwise may prove an unpleasant disappointment for him and a bit of disillusionment or grief for the patient.

This directional finger of uncertainty is pointed at the contra-lateral lung exclusively, of course, only when the collapse procedure or procedures on the original side have been consummated with the anticipated results. The tragedy of my discussion is predicated upon this fact. An unclosed cavity or an unchecked exudative process may by contigial or bronchogenic spread lead to overwhelming infection in one or both lungs. However, unfortunate this balk to our therapeutic efforts may be, to the competent observer, there is little of the element of surprise or bitterness of disappointment here; for to him the grave potentialities of such pulmonary

BY
CHAMPNEYS H. HOLMES, M.D.
Atlanta, Georgia

mischievous is well known. The more I see of this disease, its workings, its evolution, the more I hold

in dread and entertain an awesome respect for the open cavity.

The battle cry on the Tuberculosis front, or the slogan for a National Campaign could appropriately be "Close That Cavity"; proclaimed if you will, to the cadence of those lusty shouts from the gridiron—"Stop That Touch-Down", "Hold 'Em Princeton", etc.

Our disappointment is most keen in those cases where a formidable disease process has been brought under control, and perhaps rather brilliantly, by one of the collapse procedures mentioned above; and then unheralded and many times with dramatic suddenness there appears an acute spread in the contra-lateral lung. This is particularly true when the contra-lateral lung was shown by all the means at our command to be free of disease; when the therapeutic procedures were on the original side. The presence of an already existing lesion in the "good" lung, imposes the physician in charge the necessity of exercising sound judgment and meticulous caution. The latter can accrue only from a wide experience and a basic intelligence. To overlook the presence of a contralateral lesion and the failure to subsequently evaluate its potentialities cannot, of course, be condoned. Suffice to say, that occasionally in the fervor of organizing the attack against an extensive disease in a lung, it happens. The aggravation and at times, devastating spread of this lesion, may follow the application of unwise, perhaps too radical, collapse measures upon the diseased side. Perhaps it would have been better to have temporarily interrupted the phrenic nerve than to have performed the permanent paralysis; perhaps a phrenic neurectomy would have been more wise than the pneumothorax or thoracoplasty that was done; and perhaps the

selective low-tension pneumothorax would have proved effective and safer than the complete compression type. The proper selection of the collapse methods may spell the difference of success and gratification on one hand, and on the other, failure and tragedy.

When a lung is collapsed, partially or totally, there is imposed an added burden of function—proportionately greater in the total collapse—upon its opposite fellow. Parenthetically speaking, in giving the masculine gender to the lungs, the only justification I can think of is that elsewhere in this discussion on lungs I made a reference stamped with a masculine motif namely, "foot ball". The opposite fellow, then, has to carry in a great part the respiratory load. It is obvious, therefore, that the integrity of this lung could be definitely and decidedly threatened did it contain a diseased process. There again, paradoxical as it may at first appear but common to the experience to all engaged in collapse therapy, the contra-lateral disease may show marked improvement. The explanation of this welcomed phenomenon probably lies in these facts. When the more diseased lung is collapsed, it is shunted out of circulation, the toxemia reduced and a raising of the body resistance follows. Also, there is exerted a counter pressure via the mediastinum to the contra-lateral lung. This counter pressure may, and often does, effect a beneficial response as is occasioned by the pressure on the original side.

With the advent and during the following earlier days of pneumothorax treatments, a minimal lesion in the contra-lateral lung was considered the limit of safety. Anything more than this portended grave danger and contra-indicated the method.

A perfectly clear lung was greatly preferred. To-day with a wider and richer experience, with the more frequent observation of the phenomenon of improvement just described, with the application of low tension selective collapse and perhaps with all augmented by a bolder attitude, con-

siderably more liberties are being taken. In the consideration of the proposed collapse procedures for the badly affected lung, just how little or how much will the contra-lateral lung stand; just how slight or extensive a pathological involvement will it permit? To answer these questions is frequently quite difficult and the solution of the problems raised, demands experience, judgment and intelligence. Even then, only too often, failure proves the error. There, solution likewise permits a little generalization; but should be applied rather strictly to the individual case.

Such factors as a general resistance of the patient, the age, and his or her mental attitude, are paramount in this connection. If the writer may be privileged one generalization, it is this. I lay some stress upon the question of moisture in a given lesion. Everything else being equal, I would prefer taking my chances with a large lesion stethoscopically dry than with a smaller one, stethoscopically wet.

It is quite understandable how an unchecked soft process or an open cavity can, by bronchogenic spread, involve the contra-lateral lung and it is equally obvious how disease in this contra-lateral lung may be fanned into a consuming flame. It is more obscure or puzzling when an apparently perfectly performed collapse is followed after a short or longer interval by the tragic occurrence of an acute flare in the previously normal opposite lung. There may be several reasons for this, some of them in our present state of knowledge, we do not as yet know. Most assuredly in many instances, within the interior of what appears by all methods of physical and radiographic examination to be a perfectly collapsed lung, there exists open cavities and sinuses communicating with thick walled bronchi—and thusly to the opposite lung. The post-mortem is ample proof of this. Very likely an allergic state is manifest in the contra-lateral lung, causing it to be receptive to indigenous and to continued or additional exogenous infection.

(Continued to page 30)

Tuberculosis and Bronchiectasis

THERE has been a widespread belief that Pulmonary Tuberculosis and Bronchiectasis do not occur in the same patient. Since iodized oil has been introduced into the bronchial tubes, we have been able to demonstrate definite bronchiectatic dilatations of both the cylindroid and sacculated types in the basal bronchial tree along with tuberculosis. In a great many of these patients there are definite pulmonary changes both in the upper and lower lobes, there may be cavitation, and positive sputum for tubercle bacilli may be present.

The bronchiectasis may be only mild or may be severe. In the mild cases we find the patient having a persistent morning cough with variable amounts of expectoration. As the sputum or cough increases the patient believes he has increased cold and as the sputum subsides the patient believes he is again getting over this cold. This cycle reaction occurs almost regularly and improvement takes place as the tuberculous condition improves but the cough does not disappear entirely in the majority of these cases.

Bronchiectatic cases with pulmonary tuberculosis may occur as a result of the occupation of the individual. Those that are employed in occupations where irritating substances may have been introduced in the lungs from time to time, the irritation will produce changes in the bronchial tree that results in dilatation.

Some bronchiectatic cases appear to be due to an upper respiratory infection, such as bad sinuses, teeth or tonsils. When the bronchiectatic condition has become severe the removal of the primary focus usually does not improve or change the patient's condition.

When fibrous tissue develops in or about the hilus areas producing constriction in the hilus and obstructing the main stem bronchi to the base, bronchiectatic changes may occur and remain permanent. Symptoms of an asthmatic nature are usually

present and are difficult to control.

Knowing that tuberculosis and bronchiectasis can occur in the same individual and that in many patients the evidence of these bronchial changes is noticeable early, it is essential that an effort be made to prevent the increase of the bronchiectatic disease in order to avoid having the patient arrest the tuberculous disease yet leaving a permanent cough and expectoration. When a patient's cough is out of proportion to the amount of changes found on the examination and x-ray, one should try to find whether bronchiectatic changes are taking place. This can best be accomplished by the introduction of Lipiodol into the bronchial tubes and an x-ray taken. If you find the bronchial tree of greater dimension than normal or wider at the tip than it is near the hilus, it is fairly positive evidence that bronchiectatic dilatation is occurring.

Introduction of Lipiodol in the majority of patients is quite simple. It is always wise to paint the throat with a local anesthetic to reduce or eliminate the cough and swallowing reflexes and by carefully instructing the patient to breathe through the mouth, avoid swallowing or coughing, warming the Lipiodol sufficiently to make it flow freely, and drop it on the back of the tongue in a fairly steady stream, the oil will gravitate into the trachea and bronchi with ease and then by rotating the patient in various positions all parts of the lower lungs can be filled so that a clear outline of the bronchial tree can be seen. The amount of iodized oil that is necessary will vary from 5 to 20 cc. Iodized oil should not be used in patients who have recently expectorated blood.

Lipiodol has proven unusually successful both for diagnosis and treatment. We do not know the exact nature of its action but it seems to reduce the amount of cough and sputum, changes the type of sputum

(Continued to page 30)

Putrid Lung Abscess

MOST SURGEONS classify this type of lung abscess and gangrene together for diagnosis and treatment.

Probably there is no sharp distinction to be made. However, we are inclined to associate the gangrenous case with acute, fulminating conditions, where large areas or the entire lobe is necrotic; and we diagnose those more localized areas of pus surrounded by pneumonitis, as abscesses. A change in the organism may convert the abscess into a gangrenous condition.

Putrid lung abscess is definitely a clinical and pathological entity. It is produced and maintained by pathogenic anaerobes and is bronchogenic in origin.

Putrid lung abscesses are due to aspiration of infected material. In my most recent case, which will be more fully described later in this paper, the abscess was apparently due to a blade of caterpillar grass, which went into the smaller bronchial tubes of the right lung, and was located near the site of the operation, too deep to be reached or seen by bronchoscopic examination. This was coughed up, after the patient left the hospital, and was easily recognizable, the only change in the piece of grass being the loss of a few of the bristles.

Bacteriologically, most frequently the *Aspergillus* or a mixture of Vincent's and other anaerobes are found. The musty, foul odor of the sputum is due to the action of these organisms.

In my experience, these lesions are nearly always situated near the surface of the lung, and early produce a pronounced reaction in the overlying pleura. This cavity contains foul detritus and liquefying sloughs of the lung. The cavity remains filled with this class of material, and seldom shows a fluid level in the acute and sub-acute stages. The bronchial drainage is simply an overflow of this material crowded through the pneumonitis and plugged bronchial tubes, producing, of course, irritative bronchitis, manifesting

BY

FELIX P. MILLER, M. D., F.A.C.S.

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itself in cough and foul sputum.

I have never found a putrid lung abscess more than six centimeters from the pleural wall.

Dr. Frederic T. Lord, of Boston, states, calling attention to the usual peripheral site of the lung abscesses, "proximity to the pleura is in general a striking feature of the cases coming to autopsy in the Massachusetts General Hospital."

The infected material containing the anaerobes, such as the *Aspergillus Niger*, is carried down into the small bronchioles of the fourth or fifth diameter, where a stenosis of the bronchus results in the production of an infection that ulcerates through the bronchus and into the lung, where it sets up a small, parenchymatous lung abscess.

Hemorrhage is an early symptom, and is the result of the ulcerating extension into the blood vessels. Frequently, no cause can be demonstrated for the hemoptysis. Some authorities say that hemorrhage in a putrid lung abscess is more frequent than it is in early tuberculosis. The typical putrid lung abscesses coming under my observation confirm the finding of hemorrhage as an early symptom.

The course of the disease depends largely upon the degree of bronchial drainage. The extension of the abscess by necrosis makes the abscess irregular in outline. These so-called multilocular abscesses are surrounded by fibrotic tissue.

Clubbing of the fingers and toes, as in other chronic suppurative lesions of the lung, is a curious complication of this disease. This phenomenon does not show any enlargement of the bones. In the chronic cases, there may be a hyperplastic periostitis as a late complication of any type of pulmonary suppuration.

When amyloid degeneration is found, it simply denotes the chronicity and severity of the lesion.

As the fibrosis increases, more or less severe bronchiectasis develops. This con-

dition can be seen in the case that I am reporting, after the pneumonitis has subsided and the abscess is quiescent. Of course, it can only be shown by Lipiodol injections.

The extension of the gangrenous process may perforate the pleura and result in an empyema. In the pus thus formed, the anaerobic bacteria may produce gas, which will show in the x-ray picture as an empyema with partial pneumothorax.

The most striking clinical feature of putrid lung abscess is the violent coughing, with a large amount of foul sputum. The cough continues violently, even though sedatives are given. The sputum is frequently streaked with blood. The odor of the sputum increases if allowed to remain in a vessel. However, the odor is variable; if extremely foul, it is indicative of putrefaction, and is described as pulmonary gangrene.

Due to the close proximity of the pleura, pain is frequently a symptom.

The fever is not constant. The patient usually shows an afternoon rise. As new areas of lung tissue are invaded, a septic type of temperature, with morning remissions and high elevations in the evening, may develop.

After four or five months with free drainage, the abscess wall with fluid level can be detected with the x-ray and on physical examination; however, the full extent of the cavity is rarely indicated. Prior to that time, fluid level and evidences of cavity can rarely be discovered.

The physical signs in cases of putrid lung abscess and gangrene are not distinctive. It is common knowledge that small cavities are frequently overlooked by methods of ordinary physical examination. Of course, bubbling and metallic rales may be heard. The x-ray appearance and the physical signs may be more easily determined immediately following postural drainage than in any other manner. The bronchoscope can seldom locate this type of foreign body, because it is situated in the periphery of the lung, in the small bronchial tubes, which are inaccessible to this instrument. It is of value in exclud-

ing foreign body in the large bronchus, and has been of therapeutic value in promoting drainage.

Intratracheal Lipiodol injections are not of direct diagnostic value, because, the bronchioles being blocked with necrotic material, the Lipiodol does not enter the purulent lung abscess. However, they are of indirect value, in showing the extent and location of the abscess, when they show the patent bronchioles beyond the area of pneumonitis.

Most men state that putrid lung abscess is potentially a surgical lesion from the outset. However, I believe that it is best not to operate in the early acute conditions, as the cavities are certainly more difficult to find, the pleura is not strong enough to allow extensive aspiration without danger to the remaining portion of the pleura. However, to wait until the fluid level can be determined carries a higher mortality, as amyloid degeneration will begin at this time.

Pneumothorax is too dangerous, and a dubious procedure, because of the danger of tear through the pleural adhesions, thus causing a fatal empyema.

Phrenic avulsion has been of assistance before operation, in stabilizing the lung at the time of operation and during treatment. The lung after operation is smaller in size than normal, therefore diminished capacity of chest by paralysis of the diaphragm is indicated, in order to equalize this atrophy of the lung, and prevent tension when the lung is fairly expanded.

In cases where we have a mixed infection, including the Vincent's organisms, I have found Stovarsol, given several times a day, has had a beneficial effect in destroying this type of infection. Intravenous injections of Sodium Iodide have also been used with good results. The literature shows that some men prefer Neoarsphenamine.

In the early acute abscesses, it has been my practice to give the patients postural drainage, and use Stovarsol when indicated, according to the organism. By the use of the bronchoscope and by x-rays, both anterior-posterior and lateral, I en-

deavor to determine accurately the location of the abscess. If the abscess is near the periphery of the lung or the center of the lung, and I think it can be opened through the chest wall, I do so, first making sure that the pleura is attached. If the pleura is not attached, it requires a two-stage operation.

Recently, I have been using a rubber bag which is inserted under the ribs and inflated over the abscess, extrapleurally—in order to insure the formation of adhesions between the parietal and visceral pleura. I prefer this method to packing with gauze or with dental rubber dam. After eight or ten days, if the pressure is sufficient, the pleura will become adherent. I then remove the bag packing, insert an aspirating needle into the cavity and then enter with the electric cautery, burning my way around the needle into the abscess cavity. Drains are then inserted in the usual manner.

I have never had lung bleeding or a secondary hemorrhage since using the cautery and ligating the intercostal blood vessels. Post-operative pain is diminished by destruction of the intercostal nerves. Covering the edges of the ribs with redundant muscle has prevented osteomyelitis of the ribs in all my cases.

Case Report

Because of the extreme importance of a complete clinical history, I wish to give you a report on my most recent case, which, due to the etiology, the type of infection, the classical symptomatology and progress, the extent of the abscess and the end results, I consider one of the most interesting I have ever handled.

W. G., age 16, white. He began having hemorrhages which were thought to come from his throat. He was in good physical condition. He had a slight, hacking cough. Hemorrhages varied from a teaspoonful to half a cupful. He states he had no constitutional symptoms, and, in fact, gained in weight. The parents were fearful of pulmonary tuberculosis, but physical examination and x-rays did not bear out this

diagnosis. A bronchoscopic examination did not reveal any foreign body, and the source of the hemorrhage was not found. Pain appeared in the right side of his chest after the illness had been present for two months. As the symptoms were not relieved, bronchoscopic examination was repeated two or three times. Following the last bronchoscopic examination, the hemorrhage was profuse. *Aspergillus Niger* was found in the sputum. Constitutional symptoms were present — pain, with tenderness in the right side of the chest, was more pronounced. His physician reports that physical examination was not sufficient to explain the hemorrhage. He was put to bed, and in a few days had a hard chill and a high fever. The x-rays now began to show increased density in the right lung opposite the 7th and 8th interspaces and near the axillary line.

He was acutely ill. The amount of sputum increased markedly, the cough was excessive, he began to lose rapidly in weight, and blood transfusions were given. The pneumonitis increased, and an abscess was considered. Later, the increased pneumonitis and pleuritis led to the belief that possibly fluid had formed, and the side was tapped, but no fluid was found. The patient was placed in my care about two years after onset.

The past history revealed that his tonsils were removed at four years of age, under ether anesthesia, but no untoward symptoms had developed following tonsillectomy. There had been no extraction of teeth or other operation that might have produced a hematogenous infection.

At this time, the patient recalled that he had swallowed a piece of grass, which he described as "caterpillar grass." He had some cough at the time, but had no idea that this foreign body might be the cause of his trouble. However, the hemorrhages followed this accident.

His nutrition was poor, he had no appetite. He had lost in weight from 167 to 100 lbs. The cough was almost constant, and the amount of sputum in 24 hours was about 300 ccs., with a foul odor. The skin

on the right side of the mouth was irritated and showed excoriation. The throat was a distinct turkey red.

Chest: The percussion note was slightly dull in the scapular line, as far as the anterior axillary line, right lung. Dullness extended to the back and front, on the right side of the sternum, above the liver. The left side was essentially negative. Right auscultation showed diminished vesicular breathing on the posterior surface, axillary surface, and to the nipple line on the anterior surface. In this area, bronchial breathing was increased. From the fourth to the eighth rib in the axillary line, normal breath sounds were not heard. There were areas in which no sounds were audible. Bronchial breathing, large rales with clicks and rhonchi were heard. No cavernous breathing or sonorous sounds were heard. There was tenderness on pressure in the posterior axillary line opposite the 5th, 6th and 7th interspaces.

Heart: There were no murmurs. The size and position of the heart were within normal limits.

X-rays made with patient propped up in bed failed to show abscess cavity. The films resembled an unresolved pneumonia, with thick pleura. The working diagnosis was putrid abscess of the right lung, in the midaxillary line opposite the 6th interspace. He rebelled against postural drainage, stating that it had been tried, and he was too weak and sick to attempt it again. The patient was taking H. M. C. No. 2, every three hours, for the relief of cough, pain, and to produce sleep.

Under Novocaine local anesthesia, the right phrenic nerve was cut. The operating room table was placed in a marked Trendelenburg position, patient rolled on his side, and postural drainage was accomplished. About 400 ccs. of foul bloody sputum was raised by the patient. He was at once transported to the x-ray room, where anterior-posterior and lateral x-rays were made. As a result, the shadow of an apparently small abscess about the 7th interspace was located, but without fluid level. With the patient still in the

Trendelenburg position, amphoric and cavernous breathing, with large, moist rales, could be heard.

During the next five days, he had some relief, but morphine was used as before. The amount of sputum began to increase, but the character remained the same.

The morning of the fifth day, under H. M. C. and nerve block with Novocaine, an incision was made in the axillary line over the 7th rib. Portions of the 6th and 7th ribs were removed. Resection of intercostal muscles and nerves, ligations of intercostal blood vessels, and covering of the raw edges of the ribs with intercostal muscle (as outlined previously) were carried out. A large aspirating needle was inserted in the general direction of the cavity outline. A flow of gas was encountered, and it had a very foul odor. In a short time, a large amount of putrid, disintegrated lung tissue was aspirated. In all, 750 ccs. of this material was obtained. The needle was left in situ, and a portion of the parietal and adherent pleura and lung tissue, about an inch in diameter, was removed with the cautery. There was no hemorrhage. Cough, which had been incessant in spite of sedatives and anesthesia, ceased. A McCarthy Endoscope was inserted through the opening, and the large, irregular, multilocular cavity was carefully examined. Part of it had perfectly smooth walls and other portions showed necrotic material, which was removed. Plainly visible through the Endoscope were many small bronchial tubes, plugged with this necrotic material.

The x-rays and physical signs had given no adequate conception of the full extent of the cavity.

Into this cavity, a free flow of oxygen was passed for about five minutes. A large rubber tube was inserted, and fastened to the skin and muscles of the wound.

The patient returned to bed in good condition. He remained free of cough. Oxygen was passed through the drainage tube several times daily. Morphine was discontinued at the end of three or four days. The amount of discharge was seldom over

(Continued to page 28)

The Danger of Tuberculous Infection From Migratory Consumptives

AMONG the social causes responsible for the spread of tuberculosis must be included the migratory habits of many men and women suffering from pulmonary forms of the disease. A considerable number of these temporarily inhabit one or more rooms in our health resorts. Very many of these patients are comparatively poor, sometimes subsisting only on a small pension. Frequently they are sufferers from pulmonary tuberculosis in a very chronic form. They reside in private houses that have apartments to let. The danger from this poorer class of visitor applies particularly to health resorts and seaside towns, and is one of the penalties they pay for their attractiveness. These cases have often left London and other large centres on account of their health; they do not consult a doctor, if they can possibly help it, in the fresh locality to which they go to live, and therefore they are not notified and are under no restrictions whatever. They can live in apartments near the sea very cheaply during the off-season provided they leave them when the season commences. Unfortunately there are landladies ready to welcome them, and who do not mean to spend either in money or labour more than they can help on the rooms they let. Scrupulous cleanliness with such is at a discount; and no regard is given to disinfection. Consequently when the tuberculosis tenant leaves these rooms they most certainly would not be disinfected, and they would probably be very imperfectly washed and cleansed. Sometimes the landlady lets for some months to the same tenant, and then during the season to a succession of visitors. In the latter case the blankets oftentimes are not changed frequently. It is quite a common practice to run the sheets through

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a mangle to give them the appearance of not having been used.

The rooms used by a tuberculous subject may then be inhabited by a person with lowered bodily resistance, visiting the sea to recuperate after some depressing illness such as influenza, or the apartments may be taken for a delicate child who passes part of its time playing with its toys on the floor, where the infected dust accumulates. It seems morally certain that numbers of people date their infection from surroundings such as these. Tuberculosis Care Committees, where they exist, sometimes come in touch with these tuberculous cases either through their official or voluntary visitors who are working among the poor, or by the patients themselves becoming known on account of financial distress, and then applying to the Committee for help.

Control over tuberculous visitors is always irregular, uncertain, fortuitous, and only a very limited percentage of them are heard of or controlled at all. The following are some typical cases that have been on our lists, and thus they and their dwellings have come under observation.

1. An ex-service man of early middle life, with 100 per cent pension on account of tuberculosis, was living alone in a small, dirty room overcrowded with furniture and hangings. He occupied much of his time in knitting soft woolly wraps, which he raffled at Christmas time. Delicate people probably bought them to wind round their necks and mouths in cold weather. They seemed specially adapted for inhaling the tuberculosis germs with which he, no doubt, infected them. A child recently developed tuberculosis in the same house.

2. A middle-aged single man, suffering from chronic pulmonary tuberculosis, was almost a mentally deficient. He had no relations or friends to look after him,

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Reprinted from the British Journal of Tuberculosis.

and was inhabiting a single room by the sea which he would be obliged to leave as soon as the season commenced. He would certainly be most unlikely to carry out properly any disinfection of his sputum, or adequate cleansing of his sputum flask. Indeed, he probably did not realize his responsibility to others.

3. A poor woman with chronic tuberculosis and living alone was inhabiting two rooms and expectorating very freely sputum containing tubercle bacilli. She told me she never took a flask with her when she went out, saying: "Women never do; they haven't the pocket to put them in; I always spit down the drains."

4. Two sisters, both suffering from pulmonary tuberculosis, lived together in two rooms in a poor cottage. They had been receiving visits from members of our Committee for some time, when a visitor, on calling, was surprised to find them gone. They had left the town without telling us of their intentions, but before doing so we learned that they had sold their belongings, consisting of dirty and dusty furniture, carpets, and hangings, to a second-hand dealer. Old infected articles of this description must be a not infrequent means whereby the germs of tuberculosis are carried into the houses of the poor.

To try and prevent tuberculous infection by such agencies as the above, I would venture to offer for consideration the following statements and suggestions.

1. In seeking means for the prevention and arrest of tuberculosis, I think it will be generally admitted as an obvious truism that measures for the control and disinfection of the tuberculous sputum is of the utmost importance, and that the first thing to do is to agree as to the guiding principles of action by which this can best be accomplished.

2. The tuberculous patient must be under supervision as long as he or she is at large. This applies more particularly to those who are deficient (a) in education; (b) in a sense of moral responsibility. Dr. Marcus Paterson, at a tuberculosis conference, expressed the opinion

that a tuberculous patient who set all rule and authority at defiance was more dangerous to the community if uncontrolled than a lunatic. It was a remark that struck me forcibly at the time, and now with a greater experience I most emphatically endorse it.

3. It is advisable to perfect our system of notification. Health Authorities should notify one another whenever possible regarding the movements of tuberculous patients, so that a Medical Officer of Health may know the address of every consumptive arriving in his locality. I am here referring more especially to a circular issued by the Ministry of Health. Under the heading "The Keeping of the Register," appears the following note: "In County Areas the Minister has no doubt that County Councils and Tuberculosis Joint Committees will be prepared to arrange for their Tuberculosis Officer to communicate such information to the District Medical Officer of Health as well as any information which may be in the possession of the Tuberculosis Medical Officer as to deaths or removals from the *district of persons who have been under supervision*, whether or not accompanied by domiciliary or other active treatment under the Tuberculosis Scheme." I would also direct attention to the remark in the next paragraph on "information from other sources." (The italics are my own.)

4. That the *onus* of notification should rest upon the patient, him or herself, so that when a tuberculous adult who has been certified as suffering from pulmonary tuberculosis goes to live in a fresh locality, it should be his or her legal duty to notify it to the right authority. This is my main contention, and I am perfectly aware that it is a proposition that would give rise to protest from a section of the public. It is a case where sentiment may easily overrule judgment. As bearing on the matter as viewed from the legal aspect, I would refer to the well-known Collins-Hopkins case, which dealt with (to quote the newspaper headlines): "A Tenant's Right to leave Infectious Houses"

and to provide "The Seeds of Death in Furniture." *The London Times* in a leading article on this case comments under the heading "Health Conscience" thus: "It is one of the oldest principles of social life that the calamity of an infectious illness imposes on the victim the duty of taking such measures as may be within their power to protect others from danger."

When notified (by whatever means) and registered, every consumptive should be visited by the Medical Officer of Health or a skilled tuberculosis visitor. All tuberculous cases and their surroundings should be under control. The tuberculosis Care Committee can help these sufferers when necessary, and their rooms would be disinfected when vacated. The necessity for stripping and repairing the walls of a room occupied by a consumptive may be learned from an article on "The Sanitation of Wall-Papers," which appeared in the April number of *Health*.

5. I would suggest that a still further advance would be to develop the principle of segregation. It would be enormously to the advantage of the patient as well as

the public if cases similar to those I have described could live in houses or hostels especially adapted to their needs. For the price they pay for non-hygienic rooms, and expensive in comparison with their income, and considering the little value they receive, these patients should be able to obtain apartments suitably furnished, easily cleaned, and dust-free. Attention should certainly be directed to the provision of quarters properly ventilated, warmed, and exposed to sunlight. The proposed establishment should be under the management of a woman who possessed a knowledge of housekeeping and had undergone a special training for the work and understood the habits of the poor. Such a one might be found among tuberculosis visitors. She would be able to control the lives and habits of the inmates. I have met official tuberculosis visitors whose work in this capacity would be invaluable. These arrangements would go far to limit one cause of tuberculous infection, and what a change it would be for some of the chronic cases now undergoing what is euphemistically called "domiliary treatment."

THE RIGHT SIDE OF THE HEART IN PULMONARY DISEASE

By Leonard Hart

(Condensed from *New Orleans Medical and Surgical Journal*, 88: 293, 1935)

The pulmonary diseases which are most commonly productive of right cardiac disease are "bronchial asthma, emphysema, chronic bronchitis, pulmonary tuberculosis of the fibroid type, bronchiectasis, silicosis, and pneumoconiosis, rarely new growth and pressure exerted by growths in the mediastinum."

The symptoms in the progressive type of pulmonary disease may vary from a slight cyanosis and dyspnea with occasional palpitation to Ayerza's "black heart." "The symptoms of the primary lung condition can easily overshadow those of a beginning right heart failure, making it very difficult to distinguish the early cardiac involvement. But as time goes on the cyanosis increases, the dyspnea becomes pronounced, even present on very

slight exertion, attacks of palpitation increase with appearance of edema around the ankles. As the heart pathology increases, of course, passive congestion of all the viscera takes place with the associated symptoms particular to the organ involved."

"At the beginning the physical signs may be very meager: the heart borders are hard to make out, the tones are weak and the murmurs are seldom heard. One sometimes hears a systolic murmur, however, over the ensiform cartilage. There is, at first, very little change in the rhythm, maybe only an occasional extrasystole, provided only the ventricle is involved. Electrocardiogram may show a pronounced right axis deviation which is of considerable importance."

When is a Sputum Negative?

TO MANY physicians the laboratory report that a given sputum is negative for tubercle bacilli is

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almost conclusive evidence of the absence of tuberculosis in a patient in whom there is manifest pulmonary disease. A second negative report convinces them that tuberculosis is absent. In most instances their assumption is correct, but to how many does it occur what a so-called negative sputum may really mean? Are the results absolute or relative? It is assumed that negative sputum means that a smear of the material shows no tubercle bacilli on microscopic examination, when the examiner is skilled in preparing, staining and searching the slide.

How accurate is the microscopic method? Will it always find bacilli if present or, conversely, surely detect their absence? The answer is NO. It is apparent that if every portion of the preparation can be gone over with the microscope but few bacilli will be missed, yet such a procedure is rarely practiced, for it would take hours instead of minutes, a method beyond the limitations of most laboratories. Actually, only small portions of the slide come under observation, the greater part of the surface never being seen at all. When in scanty numbers, bacilli can be easily missed or only found by chance.

To determine the accuracy of the usual microscopic examination, carefully counted bacilli in varying amounts were mixed with bronchiectatic sputum and smears were made and stained in the usual way. It was rarely found possible to demonstrate the bacilli microscopically when less than 5000 per cc. were present. This method is not entirely accurate for some of the bacilli may have been washed off in staining, but it clearly and consistently demonstrated the limitations of the smear examination. Conversely from 1 to 5,000 bacilli may be present in a small amount (1 cc.) of sputum and yet the microscope ordinarily fails to reveal them. Other observers have put the number as high as

100,000 per cubic centimeter. It is thus clear that a negative sputum report may be entirely contrary

to the real facts of the case, a matter of vast importance where the diagnosis may depend on the laboratory. Recognizing this inadequacy, the problem is how to increase the concentration of the bacilli, or their actual numbers, so they will come within the range of vision or give other evidences of their presence.

Many laboratories are now concentrating sputum specimens as an aid to the recognition of rare bacilli. In this process large amounts (1 oz.) of sputum are digested and liquefied by the aid of certain dilute alkalis or acids. After proper neutralization to obtain a minimal but necessary precipitate, the liquid mass is centrifuged at high speed and the sediment or a part of it stained and examined microscopically. Thus the insoluble part of the sputum is reduced or compressed to a small bulk, resulting in more such material (bacilli) per unit of sputum. By concentration, the whole sputum, or a cross-section of it, is examined, depending on the amount of sediment obtained. It must not be forgotten that all insoluble substances are thrown down on centrifuging such as ordinary dust, carbon particles, etc. A high speed centrifuge is a necessity for concentration; it is as essential as the microscope in finding bacilli. When concentration methods fail to give better results than direct smears, it is suggested that the method may be at fault and, although the sputum may be liquefied, it is not necessarily concentrated. Among 500 sputums from patients newly admitted, 316 were found positive on direct smear (one slide). When the identical negative smear sputums were concentrated, one-third of them were found to be positive microscopically. With these results in mind, it may be stated with assurance that concentration, properly done, is a worth-while and valuable procedure.

Even after concentration, assuming that

they are present, the number of the bacilli in the sediment obtained may be too few to be readily detected with the microscope. The limits of intensive microscopic examination have now been reached. Any future detection of bacilli must depend on the actual, not relative, increase in the number of bacilli. We must grow them so that by force of numbers they declare their presence. Bacilli can be readily grown from even such contaminated material as sputum, provided the material is properly prepared or treated and a suitable medium utilized. Recent investigations show that egg-yolk, or egg combined with potato, afford the base for mediums relatively easy to make and capable of growing rare bacilli. A medium consisting of egg and potato combined was found to give results equal in every respect to animal inoculation, and had the advantage that positive results could be read much sooner than in the guinea pig.

The guinea pig, nevertheless, is still the most popular method of detecting rare bacilli and it is only recently that its pre-eminence in this field has been threatened by improved culture methods. The guinea pig is for all practical purposes a vital culture medium, self heating and of an assured composition, but it has to be fed and is subject to the usual vicissitudes of laboratory animals. Inoculation requires less skill than culturing, but it is more costly. Few laboratories can do both: either is adequate.

The sediment obtained by concentration is used for culture or inoculation. It is necessary to have it neutral or nearly so. The digesting agent (usually sodium hy-

droxide) tends to inhibit the growth of the usual contaminants but does not interfere with the development of tubercle bacilli provided the digestion period is not too long. Anticipating either of these final maneuvers, it is necessary to handle the sputum aseptically, using sterile glassware and covering when centrifuging. It is well to have the containers in which the sputum is originally collected sterilized before use. Inoculation or culture are clearly valuable procedures for, in the series above mentioned, nearly one half of the concentration negative specimens were made positive by these methods.

A summary of results in the examination of 500 sputums shows 316 positive on direct smear (one slide examined). When the negative smear sputums were concentrated, one-third of them (66) were found positive microscopically and, of the remainder, 55 turned out to be positive by inoculation or culture; 437 positive resulted in all. Tubercle bacilli were found in 90 percent of these cases by the examination of *only one specimen of sputum*. It is probable that repeated similar examinations would increase this percentage. The vast majority of these cases had recognized tuberculosis; non-tuberculous pulmonary disease accounting for 4 percent of the total.

The additional positives obtained by the methods described above are sufficient in number to encourage their use when examining sputums from suspected cases of tuberculosis. *No sputum is truly negative unless it has successfully run the gauntlet of the animal or the culture tube as well as the microscope.*

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ABSTRACTS

COHN, ALFRED E. and LEWIS, WILLIAM H.: Lobar Pneumonia and Digitalis. *American Journal of the Medical Sciences*, 189: 457-482 (April) 1935.

The question is still undecided whether the action of digitalis benefits patients suffering from lobar pneumonia. The authors made an analysis of 1456 cases to ascertain what influence the action of digitalis has on the course of this disease.

Patients suffering from lobar pneumonia encounter risks far from uniform. The risk varies, presumably, with the kind and number of factors of an untoward nature which each case presents. The authors have singled out eight such factors, as follows:

- A. Type of work.
- B. Type of pneumococcus.
- C. Age.
- D. Alcoholism.
- E. Bacteriemia.
- F. Number of lobes involved.
- G. Cardiovascular affections.
- H. Complications.

Having done heavy work presents an added risk; so does infection with pneumococcus types II and III; age is distinctly a factor and is the more serious the higher the decade, the risk being three times greater after than before the age of 40; mild alcoholism is apparently of no consequence; the presence of bacteria quadruples the danger and its continued presence raises it about eight times; involvement of more than two lobes of the lungs raises the risk from 24 per cent (two lobes) to 41 per cent (three lobes) and to 75 per cent and 100 per cent when four and five lobes, respectively, are involved; the complications which were encountered have varying significance, the important ones being empyema when not operated upon, pulmonary abscess, meningitis, pulmonary, renal and cardiac affections. In the sense that heavy work, infection with pneumococcus Types II and III, age over 40, more than moderate use of alcohol, bacteriemia, cardiovascular affections and certain complications have been regarded

as factors having an unfavorable influence, so may lighter or less severe phases in each of these categories be grouped and the rates of mortality of patients affected by them be calculated. When this is done it appears that the rate is uniformly low—lower distinctly in each class than when the severer phase in that class is experienced.

When none of the untoward factors was present death was rare, there being only two deaths among 288 patients (0.69 per cent).

When only one untoward factor was present, the outlook was favorable or at least not unfavorable, though even under these circumstances the nature of the factor was not without importance. When more than one of the untoward factors was present the rate of mortality rose depending on the number of them with which patients were obliged to deal. With two the rate was 14.4 per cent; with three it began to rise rapidly.

There appears to be little difference whether digitalis was taken or not, except when two, three and five untoward factors were present. If a sufficient dose (0.9 to 1.5 Gm.) was given "early" the mortality was less than when no digitalis was taken in those without or with one untoward factor; it was greater otherwise, but the difference is not important. If the time when digitalis was given is regarded, the mortality was less in those without or with one untoward factor; otherwise it was greater, but again the difference is slight. If small doses of digitalis (up to 0.8 Gm.) were given the death rate was smaller when there were none, one, two, or three of these factors. But the differences again are small.

The attempt finally has been made to discover whether, among the untoward elements, certain ones, when they were present alone, played a role more or less unfavorable than others when digitalis was given. The aged and the alcoholic were not aided; otherwise it did no harm.



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Whether digitalis was given or was not, whether the size of the dose was small or adequate, whether it was given early or late—all of these considerations appear to be of no deciding consequence. The form of the curve of mortality depends, it seems, entirely on the degree of severity of the affection; when it is slight, death is rare; the more severe, the greater the number of untoward factors against which the struggle must be made, the smaller become the chances of recovery. The form of the curve appears to indicate what the important factor is in deciding the outcome; it is the disease—virulence of the infection and resistance of the host, both together, rather than the action of digitalis.

Aside from having an influence on the size of the heart in pneumonia, digitalis exercises its well-known action on conduction by reducing the rate of the ventricles in auricular fibrillation. The course of events in all the cases of auricular fibrillation and the cases of auricular fibrillation and auricular flutter has been reviewed (31 patients, of whom 18, 58 per cent, died). The cases have been analyzed, though the number is small, from the point of view of the general mortality, of the age of the patients and of the other untoward factors which they presented. It was apparent that, if the cases are grouped according to the number of the "untoward" factors against which they were required to contend, the outcome in those who suffered from two (of which auri-

cular fibrillation was one) was strikingly better than that in the general series. When there were three factors (of which auricular fibrillation was one) the death rate was actually lower than the rate in the case of those who took digitalis. The three patients who died were seriously ill. When there were more untoward factors there was no important difference from the general curve of mortality. The influence of age on the development of auricular fibrillation is not certain.

Whatever may be learned from greater experience concerning the influence of fibrillating auricles on the outcome of lobar pneumonia, this at all events is apparent from the few observations which it has been possible to make; the chances in those in whom it is present are not worse than in other patients. Giving digitalis has been useful when no more than two untoward elements (besides auricular fibrillation itself) were present; the rate of mortality was favorably influenced. When there were more untoward elements, the chances were not worse than they would otherwise have been.

It appears that in those cases in which the outcome depends on safeguarding patients from the unfavorable effects of the rapid rate in auricular fibrillation and auricular flutter the administration of digitalis may be life saving.

Digitalis should not be regarded as an agent necessarily having an influence on the natural history of the pneumonic or pneumococcic infection.

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CASE REPORTS

Mrs. E. A. S. Age 31. White. Married, one child, 3 years of age.

Family History: Negative, in so far as tuberculosis is concerned, although was reared in a separate building with her family apart from a large tuberculosis sanatorium, her father being Superintendent of the sanatorium. Had all the diseases of childhood. One normal delivery.

Chief Complaint: Progressive weakness, distressing cough, irregular fever, anorexia.

Present History: Has always been well until latter part of May 1933 when an abscessed tooth was removed. Following the removal of tooth patient developed severe cold, accompanied by severe cough and some indefinite chest pains. On July 21st, 1933, had a disturbance at the site of the removal of the tooth, at which time the dentist removed a small portion of the alveolar process, at the point of extraction. On her return to her home after this procedure she had a chill. About July 28th, 1933, it was noticed, by the patient, that the cough which had been present became worse accompanied by pain in the right upper chest with fever 101. Her family physician was called who made a diagnosis of influenza and treated her accordingly. The cough, expectoration, frothy mucoid material persisted and a sputum examination at this time was negative for tubercle bacilli and a fluoroscopic examination was reported negative for any pathological condition in the lung.

On August 22nd, 1933, the patient was referred to me for examination, my findings on that date were as follows: Patient weak and depressed and appeared to be very ill. She had a very severe cough, explosive in character, moderate amount of mucoid material, streaked with yellowish material. Patient's temperature 100½, pulse 118, weight 103, normal weight 113.

Physical Examination:

Inspection: Depression above and below clavicle.

Palpation: Fremitus greatly increased over upper right lobe.

Percussion: Dullness from clavicle to fourth rib and to third interspace.

Coin test: Evidence of cavitation in the third interspace.

Auscultation Right Lung: Increased whispered voice sounds over upper lobe area, no definite rales made out in this area. The remainder of the lung shows the breath sounds to be normal.

Auscultation Left Lung: Negative.

R-L-X-Ray Findings: Hilus shadow is heavy and dense. Radiating out from the third interspace, anteriorly, there is a dense area about 5 cm. in length by 3 cm. in breadth with mossy striations extending into the middle zone. The upper bronchial tree is faintly outlined with fine interweaving and very minute studding. The lower bronchial tree is mossy and cottony with some studding throughout. The lung is well aerated.

L-L-X-Ray Findings: The hilus shows some thickening with a fan shaped area extending from the third interspace up into the apex. There is minute studding throughout the upper bronchial tree. The lower bronchial tree shows some studding and mossiness. The base is slightly more hazy than the right lung. The lung is well aerated.

Laboratory Report: Urine negative.

Blood Examination:

Wassermann	Negative.
Hemoglobin	80%
White cells	17,800
Polys	85%
Leucocytes	9%
Monocytes	6%

Sputum Examination:

Patient was asked to cough and expectorate into a metal container, when she did this a slight metallic sound was noticed and on close examination a small hard substance was found in the sputum. This was examined and found to be a small portion of an amalgam filling. She was sent at once to her dentist who examined all of her teeth in order to ascertain whether the filling had just dropped from the tooth at the time of expectoration. He reported no missing fillings or portion of fillings. Microscopically, the sputum contained pneumococcus, staphylococcus and some fusiform bacilli, no tubercle bacilli were found.

Diagnosis: Abscess of the lung. Due to inhalation of a portion of amalgam filling which occurred, undoubtedly at the time of the extraction of a tooth on July 21st, 1933.

Progress: Patient made a gradual and uninterrupted recovery after about four months. Since that time patient has reported from time to time for examination, no recurrences, and at the present time, nearly three years later, is in good health.

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THE PROPER USE OF REST (Continued from page 9)

stand in the first interview that it is his disease, that it is his life that is at stake, that it is he who must take the cure, that you can point the way and be the guide, but that you cannot and will not take the cure for him, and that whether he gets well or not will depend, to a large extent, upon his ability to reconcile himself to what he has, what he must do and how he must do it. That is, treat him with judicious sympathy.

While we must have certain general rules and regulations, especially in large institutions, I do not believe in trying to get the patient to take the cure by furnishing him with printed rules and regulations. Speaking from my experience as a patient and as a physician as well, I feel regulations and rules handed out in that manner engender in the average patient a strong desire to break them.

Some may feel that what I have outlined as to the regulation and enforcement of these phases of the cure is too great a task for the physician and that

he does not have time to go into such details. If the physician feels that way, he is too busy for his job. The ideal sanatorium has been described as an atmosphere, which reflects the attitude of the physician not only toward his patient, but toward life in general.

It may also be said that a certain class of patients may be handled in this manner while others, especially those of low intelligence, can not. From my experience of seventeen or eighteen years, devoted intensively to the handling of tuberculosis in private practice and in public institutions, I am convinced that, while certain patients are more amenable to this method of handling, there are no patients, as a class, that cannot be thus managed. It is also my conviction that it is by far the most effective method for getting tuberculous patients well and that it brings to the physician the greatest degree of satisfaction and joy through a work well done.

PUTRID LUNG ABSCESS (Continued from page 16)

two or three ounces, and by the end of ten days, was not more than one ounce. He gained rapidly in weight, and at the time he was discharged, he weighed 187 pounds, and was free of cough and expectoration.

Conclusions

1. Putrid lung abscess is definitely a clinical and pathological entity, bronchogenic in origin, produced and maintained by pathogenic anaerobes, usually *Aspergillus* or mixture of Vincent's and other anaerobes.

2. Nearly always situated near surface of lung.

3. Rarely demonstrable with the x-ray in the early stages. Fluid level appears late. More easily determined immediately following postural drainage. Bronchoscope and Lipiodol injections ineffective for diagnosis.

4. Surgery the treatment of choice. Phrenic avulsion, followed by aspiration and drainage, using electric cautery, destroying intercostal nerves, ligating intercostal blood vessels, and covering edges of ribs with redundant muscle to prevent osteomyelitis.

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THE TRAGEDY OF THE CONTRA-LATERAL LUNG (Continued from page 11)

The more I engage in collapse therapy, the more I am inclined to believe that the best gauge as to the success or failure of this method, placing it ahead of the temperature curve, the weight curve, the physical examination and even the x-ray investigation, is the question of sputum conversion. The conversion from a positive to a negative sputum, and its main-

tenance there, tends to insure success; whereas the failure of conversion or the reappearance of a positive sputum afterwards, portends that tragedy about which we have been writing.

With the tragical occurrence disease in the contra-lateral lung, many things can be tried and much done—but that is another story.

TUBERCULOSIS AND BRONCHIECTASIS (Continued from page 12)

and relieves the attacks in asthmatic cases. When the bronchiectasis is due to obstruction of the large bronchi at the hilus some relief is obtained by the introduction of Lipiodol but a recurrence of shortness of breath, wheezing and intermittent sputum may occur.

Primary foci of infection, especially of the upper respiratory tract, must be cleared as much as possible. Autogenous vaccine injections or the use of ordinary stock vaccine injections have proven very beneficial. Where considerable sputum is present, without fever, postural drainage should be encouraged. When a unilateral case of bronchiectasis with tuberculosis occurs, paralysis of the phrenic nerve may permit sufficient rise of the diaphragm to close some of the bronchiectatic pockets.

Artificial pneumothorax has not proven of any permanent value. It is not wise to attempt intra-pulmonary surgery in the bronchiectatic cases.

To summarize: it is wise to remember that tuberculosis and bronchiectasis can occur in the same patient; that patients with severe cough and expectoration, that cannot be accounted for by the amount of tuberculous changes, should be suspected of having bronchiectasis and if they are not of the hemorrhage type they should have Lipiodol injections into the bronchial tree both for diagnosis and treatment; all upper respiratory foci of infection should be eliminated if possible; advanced cases of bronchiectasis should have postural drainage and immunization by vaccine.

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